Claims

1. A thin-layer LED chip (5) comprising an epitaxial layer sequence (6) that is disposed on a carrier element (2) and comprises an electromagnetic-radiation-generating active region (8), and a reflective layer (3) that is disposed on a principal surface of said epitaxial layer sequence (6) facing toward said carrier element (2) and reflects at least a portion of the electromagnetic radiation generated in said epitaxial layer sequence (6) back thereinto,
characterized in that
disposed on a radiation extraction surface (7) of said epitaxial layer sequence (6) facing away from said carrier element (2) is a structured layer (1) containing a glass material and exhibiting a structure that includes mutually adjacent protuberances (5) that taper away from said radiation extraction surface (7) and have a lateral grid size that is smaller than one wavelength of an electromagnetic radiation emitted from said epitaxial layer sequence (6).

2. The thin-layer LED chip as in claim 1,
characterized in that
the refractive index of said layer (1) lies between the refractive index of a material of a side of said epitaxial layer sequence (6) adjacent said radiation extraction surface (7) and the refractive index of a medium intended as an ambient for said thin-layer LED chip (5).

3. The thin-layer LED chip as in claim 1 or 2,
characterized in that
said structure comprises protuberances (5) that are largely periodically arranged.

4. The thin-layer LED chip as in one of claims 1 to 3,
characterized in that
said protuberances (5) are convexly curved as viewed from the outside.

5. The thin-layer LED chip as in one of claims 1 to 4,
characterized in that
said glass material is a spin-on glass.

6. The thin-layer LED chip as in one of claims 1 to 5,
characterized in that
the height of said protuberances (5) in the direction away from said radiation extraction surface (7) is smaller than one wavelength of an electromagnetic radiation emitted from said epitaxial layer sequence (6).

7. A method for making a thin-layer LED chip (5) comprising an epitaxial layer sequence (6) that is disposed on a carrier element (2) and contains an electromagnetic-radiation-generating active region (8), and a reflective layer (3) that is disposed on a principal surface of said epitaxial layer sequence (6) facing toward said carrier element (2) and reflects at least a portion of the electromagnetic radiation generated in said epitaxial layer sequence (6) back thereinto,
characterized in that
said epitaxial layer sequence (6) disposed on said carrier element (2) is prepared, a layer (1) containing a glass material is applied to a radiation extraction surface (7) of said epitaxial layer sequence (6) facing away from said carrier element (2), and a structure is introduced into at least a portion of said layer (1), said structure including mutually adjacent protuberances (5) that taper in the direction away from said radiation extraction surface and have a lateral grid size that is smaller than one wavelength of an electromagnetic radiation emitted from said epitaxial layer sequence (6).

8. The method as in claim 7,
characterized in that
said layer (1) is fabricated by applying a still-molten spin-on glass to said radiation extraction surface (7) and thermally treating said spin-on glass such that it hardens and densifies.

9. The method as in claim 8,
characterized in that
the spin-on glass is applied by spin-coating and/or printing.

10. The method as in one of claims 7 to 9,
characterized in that
said structure is introduced into said layer (1) by grayscale lithography (6).

11. The method as in one of claims 7 to 10,
characterized in that
said structure is introduced in such fashion that it comprises periodically arranged protuberances (5).

12. The method as in one of claims 7 to 11,
characterized in that
the refractive index of said layer (1) lies between the refractive index of a material of a side of said epitaxial layer sequence (6) facing toward said radiation extraction surface (7) and the refractive index of a medium intended as an ambient for said thin-layer LED chip (5).

13. The method as in one of claims 7 to 12,
characterized in that
said structure is introduced in such fashion that the height of said protuberances (5) in the direction away from said radiation extraction surface (7) is smaller than one wavelength of an electromagnetic radiation emitted from said epitaxial layer sequence (6).